Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

1-6. (Cancelled).

7. (Previously Presented) A communication method for use by a wireless transceiver, comprising:

demultiplexing, by a demultiplexer, an input signal into a first plurality of demultiplexed signals;

weighting and combining, by a first circuit configured to weight and combine in the baseband domain, said first plurality of demultiplexed signals prior to upconverting;

upconverting, by upconverters, said first plurality of demultiplexed signals into a first plurality of upconverted signals;

dividing, by dividers, said first plurality of upconverted signals into a second plurality of divided signals;

weighting, by a second circuit configured to weight, said second plurality of divided signals to form a second plurality of weighted signals, wherein weights used by the second circuitry to weight said second plurality of divided signals are obtained from an eigenvector corresponding to a largest eigenvalue of a cross-correlation matrix;

combining, by a combiner, ones of said second plurality of weighted signals to form a third plurality of combined signals; and

transmitting said third plurality of combined signals over a plurality of antennas.

8. (Previously Presented) The method of claim 7 wherein said third plurality of combined signals are each amplified by a respective amplifier and transmitted by a respective antenna.

9. (Previously Presented) The method of claim 7 further including converting, by a digital-to-analog converter, said first plurality of demultiplexed signals into analog signals.

10. (Cancelled).

11. (Original) The method of claim 7 wherein said second plurality of divided signals are RF signals and wherein said weighting and combining are performed within the RF domain.

12. (Previously Presented) The method of claim 8 wherein said first plurality of demultiplexed signals are less in number than said plurality of antennas.

13. (Original) The method of claim 7 wherein each of said first plurality of upconverted signals is divided into a set of signal components equal in number to said third plurality of combined signals.

14-18. (Cancelled).

19. (Currently Amended) A wireless communication apparatus, comprising:

a demultiplexer configured to demultiplex an input signal into a first plurality of demultiplexed signals;

first circuitry configured to weight and combine, in the baseband domain, said first plurality of demultiplexed signals prior to provision to ~~the~~ an upconverter;

an upconverter configured to upconvert said first plurality of demultiplexed signals into a first plurality of upconverted signals;

dividing elements configured to divide said first plurality of upconverted signals into a

second plurality of divided signals;

second circuitry configured to weight said second plurality of divided signals so as to form a second plurality of weighted signals, wherein weights used by the second circuitry to weight said second plurality of divided signals are obtained from an eigenvector corresponding to a largest eigenvalue of a cross-correlation matrix; and

a combiner configured to combine ones of said second plurality of weighted signals in order to form a third plurality of combined signals that is transmitted through an antenna structure.

20. (Original) The communication apparatus of claim 19 wherein said third plurality of combined signals are transmitted via a corresponding third plurality of antennas of said antenna structure.

21. (Previously Presented) The communication apparatus of claim 19 further including a digital-to-analog converter configured to convert said first plurality of demultiplexed signals into analog signals.

22. (Cancelled).

23. (Original) The communication apparatus of claim 19 wherein said second plurality of divided signals are RF signals and wherein said weighting and combining are performed within the RF domain.

24. (Original) The communication apparatus of claim 20 wherein said first plurality of demultiplexed signals are less in number than said third plurality of antennas

25-32. (Cancelled).

33. (Currently Amended) A wireless communication apparatus, comprising:

a demultiplexer configured to demultiplex an input signal into a first plurality of demultiplexed signals;

circuitry configured to weight and combine, in the baseband domain, said first plurality of demultiplexed signals prior to provision to the upconverter;

an upconverter configured to upconvert said first plurality of demultiplexed signals into a first plurality of RF signals; and

an RF processing network configured to perform weighting and combining operations in the RF domain upon said first plurality of RF signals to produce a second plurality of RF signals that is transmitted by an antenna structure, wherein RF processing network performs the weighting operations using weights that are obtained from an eigenvector corresponding to a largest eigenvalue of a cross-correlation matrix,

wherein said RF processing network includes an arrangement of dividing elements configured to divide said first plurality of RF signals into a third plurality of divided RF signals, and

wherein said RF processing network further includes:

an arrangement of weighting elements configured to weight said third plurality of divided RF signals so as to form a third plurality of weighted RF signals;

a combiner arrangement configured to combine ones of said third plurality of weighted RF signals to form said second plurality of RF signals.

34-40. (Cancelled).

41. (Currently Amended) The apparatus of claim ~~35~~ 33 wherein values of said

weighting elements are selected to maximize an output signal-to-noise ratio of a receiver disposed to receive said second plurality of RF signals.

42-43. (Cancelled).

44. (Original) The apparatus of claim 19 wherein values of said weighting elements are selected to maximize an output signal-to-noise ratio of a receiver disposed to receive said third plurality of combined signals.

45. (New) The method of claim 7 wherein said wireless transceiver comprises a MIMO transceiver.

46. (New) The communication apparatus of claim 19 wherein said communication apparatus is part of a MIMO transceiver.

47. (New) The apparatus of claim 33 wherein said apparatus is part of a MIMO transceiver.

48. (New) The method of claim 7 wherein said wireless transceiver employs OFDM.

49. (New) The communication apparatus of claim 19 wherein said communication apparatus employs OFDM.

50. (New) The apparatus of claim 33 wherein said apparatus employs OFDM.

51. (New) The method of claim 7 wherein said wireless transceiver employs spread

spectrum communication techniques.

52. (New) The communication apparatus of claim 19 wherein said communication apparatus employs spread spectrum communication techniques.

53. (New) The apparatus of claim 33 wherein said apparatus employs spread spectrum communication techniques.